Docket No. 2003-126-TAP

CLAIMS:

What is claimed is:

1   1.   A magnetoresistive sensor, comprising:
2   a plurality of sensor stack layers; and
3   at least one stabilizer depression formed in one
4   sensor stack layer within the plurality of sensor stack
5   layers, wherein the at least one stabilizer depression
6   imparts a restorative force on a magnetic field of a free
7   layer of the magnetoresistive sensor to align the
8   magnetic field with a bias direction.

1   2.   The magnetoresistive sensor of claim 1, wherein the
2   magnetoresistive sensor is a top spin valve sensor.

1   3.   The magnetoresistive sensor of claim 1, wherein the
2   magnetoresistive sensor is a bottom spin valve sensor.

1   4.   The magnetoresistive sensor of claim 2, wherein the
2   one sensor stack layer is one of an antiferromagnetic
3   layer and a pinned layer.

1   5.   The magnetoresistive sensor of claim 3, wherein the
2   one sensor stack layer is a Gap 1 Alumina layer.

1   6.   The magnetoresistive sensor of claim 1, wherein the
2   one sensor stack layer is a sensor stack layer adjacent
3   one of the free layer and a pinned layer.

Docket No. 2003-126-TAP

1   7.   The magnetoresistive sensor of claim 1, wherein the
2   at least one stabilizer depression is formed under a
3   permanent magnet.

1   8.   The magnetoresistive sensor of claim 1, wherein the
2   magentoresistive sensor is part of a magnetic media read
3   head.

1   9.   The magnetoresistive sensor of claim 1, wherein the
2   at least one stabilizer depression is formed in the one
3   sensor stack layer by milling the at least one stabilizer
4   depression in the one sensor stack layer, and wherein
5   other sensor stack layers of the plurality of sensor
6   stack layers are deposited on the milled one sensor stack
7   layer.

1   10. The magnetoresistive sensor of claim 9, wherein the
2   at least one stabilizer depressions have a depth such
3   that after deposition of the other sensor stack layers on
4   the milled one sensor stack layer, the magnetic field of
5   the free layer of the magnetoresistive sensor experiences
6   restorative forces due to the at least one stabilizer
7   depression.

1   11. A method of providing a magnetoresistive sensor,
2   comprising:
3   providing a plurality of sensor stack layers; and
4   providing at least one stabilizer depression formed
5   in one sensor stack layer of the plurality of sensor
6   stack layers, wherein the at least one stabilizer

Docket No. 2003-126-TAP

7 depression imparts a restorative force on a magnetic

8 field of a free layer of the magnetoresistive sensor to

9 align the magnetic field with a bias direction.

1 12. The method of claim 11, wherein the magnetoresistive

2 sensor is a top spin valve sensor.

1 13. The method of claim 11, wherein the magnetoresistive

2 sensor is a bottom spin valve sensor.

1 14. The method of claim 12, wherein the one sensor stack

2 layer is one of an antiferromagnetic layer and a pinned

3 layer.

1 15. The method of claim 13, wherein the one sensor stack

2 layer is a Gap 1 Alumina layer.

1 16. The method of claim 11, wherein the one sensor stack

2 layer is a sensor stack layer adjacent one of the free

3 layer and a pinned layer.

1 17. The method of claim 11, wherein providing the at

2 least one stabilizer depression includes forming the at

3 least one stabilizer depression under a permanent magnet.

1 18. The method of claim 11, wherein the magentoresistive

2 sensor is provided in a magnetic media read head.

1 19. The method of claim 11, wherein providing the at

2 least one stabilizer depression includes forming the at

Docket No. 2003-126-TAP

3   least one stabilizer depression in the one sensor stack

4   layer by milling the at least one stabilizer depression

5   in the one sensor stack layer, and wherein providing the

6   plurality of layers includes depositing other sensor

7   stack layers of the plurality of sensor stack layers on

8   the milled one sensor stack layer.

1   20. The method of claim 19, wherein providing the at

2   least one stabilizer depression includes milling the one

3   or more stabilizer depressions to have a depth such that

4   after deposition of the other sensor stack layers on the

5   milled one sensor stack layer, the magnetic field of the

6   free layer of the magnetoresistive sensor experiences

7   restorative forces due to the at least one stabilizer

8   depression.